

*E2*

3. The cell of claim 1, which is a ~~Salmonella~~ aro mutant cell.

5. The cell of claim 1, wherein the *Helicobacter* immunogen is secretory polypeptide from *Helicobacter*, an immunologically reactive fragment thereof, or a peptide mimotope thereof.

6. The cell of claim 1, wherein the *Helicobacter* immunogen is selected from a group consisting of the antigens adherence-associated lipoprotein A (AlpA), adherence-associated lipoprotein B (AlpB), immunologically reactive fragments thereof, or a peptide mimotope thereof.

7. The cell of claim 1, wherein said nucleic acid molecule encoding a *Helicobacter* immunogen is capable to be expressed phase variably.

8. The cell of claim 7, wherein said nucleic acid molecule encoding the *Helicobacter* immunogen is under control of an expression signal which is substantially inactive in the pathogen and which is capable to be activated by a nucleic acid reorganization caused by a nucleic acid reorganization mechanism in the pathogen.

*E3*

9. The cell of claim 8, wherein the expression signal is a bacteriophage promoter, and the activation is caused by a DNA reorganization resulting in the production of a corresponding bacteriophage RNA polymerase in the pathogen.

10. The cell of claim 1, further comprising at least one second nucleic acid molecule encoding an immunomodulatory polypeptide, wherein said pathogen is capable to express said second nucleic acid molecule.

11. Pharmaceutical composition comprising as an active agent a recombinant attenuated cell according to claim 1, together with a pharmaceutically acceptable diluent, carrier or adjuvant.

13. A method for the preparation of a living vaccine comprising providing the ~~Salmonella~~ cell of claim 1 and formulating the cell in a pharmaceutically effective amount for inducing protective immunity with pharmaceutically acceptable diluents, carriers or adjuvants.

14. A method for preparing a recombinant attenuated ~~Salmonella~~ cell according to claim 1, comprising the steps:

- a) inserting a nucleic acid molecule encoding a *Helicobacter* immunogen into an attenuated ~~Salmonella~~ cell, wherein a recombinant attenuated ~~Salmonella~~ cell is obtained, which is capable of expressing said nucleic acid molecule or is capable to cause expression of said nucleic acid molecule in a target cell, and
- b) cultivating said recombinant attenuated ~~Salmonella~~ cell under suitable conditions.

19. A method of treating an infection by *Helicobacter pylori*, comprising administering to a patient in need thereof a composition comprising the cell of claim 1 in a pharmaceutically effective amount for inducing protective immunity.

20. A method of preventing an infection by *Helicobacter pylori*, comprising administering to a patient a composition comprising the cell of claim 1 in a pharmaceutically effective amount for inducing protective immunity.

22. A method of inducing protective immunity against a *Helicobacter* infection in a mammalian host comprising administering to a mammalian host in need of protective immunity an effective amount of the cell of claim 1.

Please add new Claim 23: